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FAO Fisheries Biology Technical Paper No.13
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SOME NOTES ON THE USE OF THE MANATEE (Trichechus) FOR THE CONTROL OF AQUATIC WEEDS

Prepared by

BIOLOGY BRANCH, FISHERIES DIVISION, FAO

FISHERIES DIVISION, BIOLOGY BRANCH
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, September 1961

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PURPOSE OF THIS SERIES

This is one of a group of Technical Papers (see inside front cover) dealing with various aspects of the work of FAO Fisheries Division, Biology Branch, including the review of pertinent information on particular topics, to meet requests for assistance, for presentation to technical and scientific meetings, etc. Extra copies can be obtained by application to:

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PREPARATION OF THIS PAPER

To meet requests for information on this subject; not a complete review, nor a contribution of new knowledge. Based largely on documents and facts provided by Mr. W.H.L. Allsopp. First draft by Mr. Wm.A. Dill, Chief, Inland Resources Section, Biology Branch.

Distribution:

FAO Fisheries Division
FAO Regional Fisheries Officers
Mr. W.H.L. Allsopp
IUCN
Other fisheries workers and agencies concerned with this subject

"Current Bibliography" Entry:

FAO, Fisheries Division. 61-10843 F
Biology Branch (1961)
Tech. Pap. Fish. Biol. Br. FAO (13): 6p
Some notes on the use of the manatee (Trichechus) for the control of aquatic weeds

Brief historical summary of published information and comment on policy and economic questions.

Project No.
2.42

SOME NOTES ON THE USE OF THE MANATEE (Trichechus) FOR THE CONTROL OF AQUATIC WEEDS

Prepared by Biology Branch, Fisheries Division, FAO

INTRODUCTION

The following notes have been prepared to meet some immediate requests, especially by fisheries departments, for information on the manatee and its use for the control of aquatic weeds. They will also serve to clarify the position of the Food and Agriculture Organization of the United Nations (FAO) and the Indo-Pacific Fisheries Council (IPFC) in this matter. These notes are not intended to constitute a thoroughreview of the subject nor do they imply that either FAO or the IPFC recommends the introduction of manatee for weed control.

THE MANATEE AND THE DUGONG

The manatee is a mammal belonging to the order Sirenia, or "sea cows", a group of wholly aquatic herbivores inhabiting tropical and sub-tropical coastal seas and rivers. 1/

Sea cows are large in size (about 8 to 9 feet long) with robust spindle-shaped bodies. The fore limbs are paddle-like; hind limbs are absent. The tail is broad, flat and expanded transversely. The muzzle is blunt, mouth small and lips fleshy. The nostrils are on the upper surface of the snout. The teeth have enamel. There are no external ears. The skin is tough; hairs are few and scattered. The teats are two in number and placed on each side of the chest. 2/

1/ "The name Sirenia was given in allusion to the supposed resemblance of these animals to mermaids. A dugong as seen at a distance from the deck of a ship and especially if floating half upright, with a baby under its flipper, might well be taken for a mermaid ..." Anon., 1937. Sirenia. The Encyclopaedia Britannica, 14th Edition, Vol. 20, p. 718.)

2/ The similarity in position and number between these teats and those of human beings as well as the possession of a supposedly fishlike (really more whalelike) tail may further have fostered the mermaid legend. (Moore, Joseph Curtis, 1961. Sailors' siren. Natural History, Vol. LXX, No. 1, pp. 54-55.)

The order Sirenia is composed of two families: the Dugongidae and the Trichechidae.

The Dugongidae represented by the single genus and species, Dugong dugong, sometimes confused with the manatees, are primarily marine in habitat, browsing on seaweed and never being found far from the coast. The dugong dwells in the Red Sea, Indian Ocean and Western Pacific.

The manatees, members of the family Trichechidae, which is composed of a single genus, Trichechus and three species, inhabit bays, lagoons, estuaries, and the larger warm rivers of the Atlantic coast of southern North America, South America and Africa. They may ascend far up some of the rivers such as the Amazon and, in Africa, have ascended as far upstream as Lake Chad.

Manatees and the dugong are utilized by man for food, oil and leather. They are said to have few natural enemies but are almost defenseless against attack by man. They have been brought to extinction or near-extinction in some parts of their natural range.

THEIR POSSIBLE USE FOR AQUATIC WEED CONTROL

In recent years there has been worldwide interest in the control of unwanted aquatic vegetation in inland waterways used for transport and in ponds, lakes and streams supporting fisheries. Chemical control and the possibility of adequate biological control have been given special attention, and the manatee (as well as the dugong) has been one of the forms considered for this latter purpose. An article in the Commercial Fisheries Review, Vol. 22, No. 4, for April 1960, p. 5, stated that FAO and the IPFC were exploring the possibility of introducing the manatee into Ceylon and Thailand to control aquatic vegetation. The genesis of the statement probably lay in the fact that a project for the study of the possibilities of combating water weeds, especially water hyacinth, by various means, including the use of "herbivorous water animals", was listed in the report of the Inland Transport Committee (7th session) to the Economic Commission for Asia and the Far East (ECAFE) at its 14th session, Malaya, 1958. The cooperation of TAA and/or FAO was to be sought.

Some information on the control of aquatic weeds (especially with 2, 4-D) and including some available data on manatees was sent to the Transport Division of ECAFE at its request by the FAO Regional Fisheries Officer for Asia and the Far East in Bangkok. The IPFC Secretariat also distributed some material on manatee in British Guiana, which had been secured by ECAFE.[1/] These, however, constituted FAO's only contributions to the study.

1/ This information originally provided by the Department of Agriculture, Georgetown, British Guiana, was reproduced by the Secretariat of IPFC and sent to the Chairman and members of IPFC's Panel A (Inland Fisheries) and Technical Committee I and the Executive Council on 12 February 1958 (Ref. ExCo 58/3).

The statement therefore was substantially incorrect and the article, as a whole, misleading, since neither FAO nor the IPFC had studied the practicability of such an introduction nor had they backed such a project. [1]

"ALLSOPP'S MANATEES"

In November 1960, Mr. W.H.L. Allsopp, Fishery Research Officer of the Department of Agriculture, British Guiana, published a short note in Nature on the ecology and use of the manatee (Trichechus manatus) for aquatic weed control in British Guiana. [2]

The article had a decided appeal for the popular press, and Time's article, "The Useful Manatee" spoke of a "novel solution" to the weed problem and of the "dramatic" work and "free labor" of "Allsopp's manatees". [3] Other news media echoed the Time write up.

Mr. Allsopp's paper was intended only as a preliminary note prior to the publication of a more extended account of ecological studies. However, the response of fisheries people was immediate and - for a time- gave promise that "Allsopp's manatees" might become as famous as Pavlov's dogs. Several fisheries agencies began to contemplate their introduction, and the aid of FAO in obtaining information on its usefulness has repeatedly been solicited..

Since few of FAO's correspondents on the subject seem to have seen the original article, it is reproduced below in its entirety for information purposes.

"Since 1885 the Botanic Gardens in Georgetown, British Guiana, has had in some ornamental pools manatees (Trichechus manatus, order Sirenia), which have been always fed with grass by visitors. These pools have been kept clear by the manatees and it seemed always necessary to get additional food in the form of grass. It was therefore felt that experiments should be proceeded with using these animals for weed control, and some have been maintained in the reservoirs of the water purification plant and have effectively kept these clear of aquatic plants, particularly Cabomba aquatica, Anacharis, Leersia, Utricularia.

1/ A disclaimer to this effect was published in the Commercial Fisheries Review, Vol. 22, No. 9, for September 1960, p. 70.

2/ Allsopp, W.H.L. (1960) The manatee: ecology and use for weed control. Nature, Vol. 188, No. 4752, p. 762.

3/ Time, (Atlantic Edition), Vol. LXXVI, No. 25, p. 51.

"We have since found that the manatee is not merely an occasional but also a very voracious and determined grass feeder, which can in fact clear trenches which are covered with grass or Nymphaea, Nelumbo, Eichornia, as well as submerged aquatics, and they have been doing a very commendable job in confined areas. During 1959/60 several experiments were carried out, and it has been found that two manatees 7½ ft. long were capable of clearing a canal 22 ft. wide and 1,600 yd. long in 17 weeks. They will also keep it clear of weeds to allow the free passage of water and will break any wood barrier fixed across the canal in order to get at grass beyond the barrier. These animals are not numerous and seemingly very slow at reproduction. I have collected 46 of them to date and they have been distributed in several canals for drainage and irrigation schemes throughout the country. They are found in the rivers of British Guiana and are caught by fishermen in seines, but can easily be drowned.

Much information has been collected on the anatomy through the University of Florida and much more information is desired on their ecology and reproductive habits. I would like to have any further information available. I have already had inquiries from Ceylon, Thailand and Malaya as to the prospects of the use of these animals in those countries for weed control of the water hyacinth and other aquatic plants which are a costly nuisance.

As a means of water-weed control, the use of these animals is far more effective and lasting than the usual chemical weedicides. They are harmless to fishes and other water animals, and are seemingly unaffected even by electric eels which are normally inhabitants of some of the irrigation canals in which these manatees were introduced. The one risk in their wide use is that they may be slaughtered for their meat; legislation is now being enacted to ensure their complete protection.

A full account of ecological work on these mammals will shortly be published."

THE PRESENT SITUATION

In view of the widespread importance of aquatic weed control in fishing waters and irrigation canals, and the present specific interest in the possibility of using the manatee for this purpose, FAO has taken several steps to secure more information on the subject.

The Organization has requested the Chief Secretary of the City of Georgetown, British Guiana, to keep it informed of its progress in obtaining further information on the manatee, especially with respect to its biology. The Biology Branch of the Fisheries Division has solicited the interest of the Secretariat of the International Union for the Conservation of Nature and Natural Resources (IUCN). Its Survival Service Commission is now making inquiries as to the occurrence, status and degree of protection afforded to both manatees and dugongs throughout their natural range.

The Biology Branch has also discussed the question directly with Mr. Allsopp, and it is hoped that he may be able to prepare a synoptic review of the literature on this mammal and its possible use for aquatic weed control.

Pending further review of the subject, it may be well to summarize some of the factors which should be considered before any serious recommendation for the introduction of manatee is entertained. Some of the factors weighing against successful transplantation are that according to report: manatees bruise easily and have to be handled rather carefully, not turned on their backs lest they suffocate (from the weight of a stomach full of weeds on their dorsally situated lungs), not held under water too long lest they drown. Long transportation might be difficult and expensive. Little is known regarding their artificial breeding and rearing. They are reported to produce only one offspring at a time and are slow-growing. It might take a very long time to build up a population large enough to be effective. A major consideration in trying to establish them in areas where they cannot be given complete protection is that they are good to eat, prized for food, and being slow-moving, can be killed easily by spearing or harpooning.

On the positive side, aside from what has already been said by Allsopp (op cit), is the fact that the manatee appears to be an almost completely unselective herbivore except that it will not touch woody plants. It grazes in a systematic manner so that in an irrigation canal the front of the weed is steadily moved back, but after it has cleared an area it periodically combs it thereafter to keep the water clear. It is a social feeder, and a number of manatees grazing together seem to eat more than the same number working separately.

In the state of our present knowledge it appears that manatees may be quite useful for aquatic weed control in certain confined areas of British Guiana; e.g., some domestic water supply reservoirs and some canals and drainage systems. Whether or not they would be equally effective in other areas of the world - especially areas to which they are not indigenous - or in very large or "open" water systems with rapidly growing plant populations is unknown.

With respect to the latter question, and merely as food for further thought, it may be noted that Allsopp (op cit) states that ". . . . two manatees 7½ ft. long were capable of clearing a canal 22 ft. wide and 1,600 yd long in 17 weeks". If it is assumed that these were "median manatees", and without consideration of any other factors, then one manatee could be expected to clear only 3.7 acres (about 1.5 hectares) in the course of one year.

While the above conclusion may not be quantitatively correct, it does indicate the type of reasoning that might be employed before one decided to transplant manatees. The amount of economic benefit (to fisheries, irrigation, transport, etc.) must certainly be weighed against the costs of capture, transportation and establishment of a new area. Furthermore, it must be clearly recognized that the introduction of any exotic species, however innocuous it may appear, sometimes creates problems far greater than those which it attempts to solve or which were contemplated originally. One should therefore attempt to foresee the biological consequences (which often prove to have economic effects) and thus avoid - to paraphrase Benjamin Franklin - paying too much for one's manatee.

In summarizing, it may be said that the introduction of manatees to other parts of the world may eventually prove to be useful, but the present state of our knowledge does not permit any recommendation to this effect. The Biology Branch will be pleased to provide further information when it becomes available. Meanwhile, it welcomes receipt of supplemental data.